INTERNAL WORKING DOCUMENT

NO. 88-01

SOFTWOOD GROWTH RESPONSE STUDY

AFTER ROUNDUP TREATMENTS

Natural Resources and Energy / Ressources naturelles et Énergie

Department of Natural Resources

Timber Management Branch

INTRODUCTION

Very few studies have been undertaken or results documented on softwood growth response to Roundup treatments in New Brunswick. Roundup, or Vision as it is known now, has only been registered for aerial plantation tending since 1984 and therefore only a three year maximum response could be measured on DNRE's operational areas. It has, however, been used experimentally since 1978 so there are areas where potentially older growth data could be obtained.

In these experimental applications, no parts of the targetted plantations were left as control. Timber Management Branch was more concerned with the immediate efficacy of the product on the unwanted species rather than the measurement of the long-term growth benefits the softwood stock would produce. The only way in which control areas could be incorporated into this study were to choose areas which had a sufficient amount of green strips or missed spray swaths so that an equal number of control and treated plots could be established.

After tedious investigation, Timber Management Branch found five plantations which fit the criteria, two jack pine and three black spruce. The growth response periods (years since herbicide treatment) range from 2 to 9 years.

METHODS

Five to six circular plots in the control strips and the same number in the sprayed areas were permanently established in each plantation. These plots measured .02 hectares in size. The heights of only the planted crop trees were measured on each plot in 4 of the 5 plantations. In the other plantation, Timber Management Branch decided to measure the diameter of each tree 6" above ground as well as their heights in order to determine a relative volume response.

The average number of trees and the average height per tree were calculated for the control and treated areas and reported in Table 1. The average number of trees was converted into per hectare values. In an area at Wildcat Brook, the average diameter of the trees in the two different treatments was also calculated and an average volume index was computed using this simple formula developed by [1]Perry, 1964:

$V = D^2H$ where V = relative volume
D = diameter 6" above ground line
H = total height

The increase obtained in the parameters measured for the treated areas was expressed relative to the control areas for each plantation, which in this process acquired the base value 0 and is shown in Figure 1.

[1] Perry, T.O. and A.Y. Roberts, 1964.
Volume formulas for loblolly pine seedlings in the vicinity of Raleigh. North Carolina. Journal of Forestry. March: 186-187.

Table 1.

CROP TREE GROWTH RESPONSE TO ROUNDUP TREATMENTS

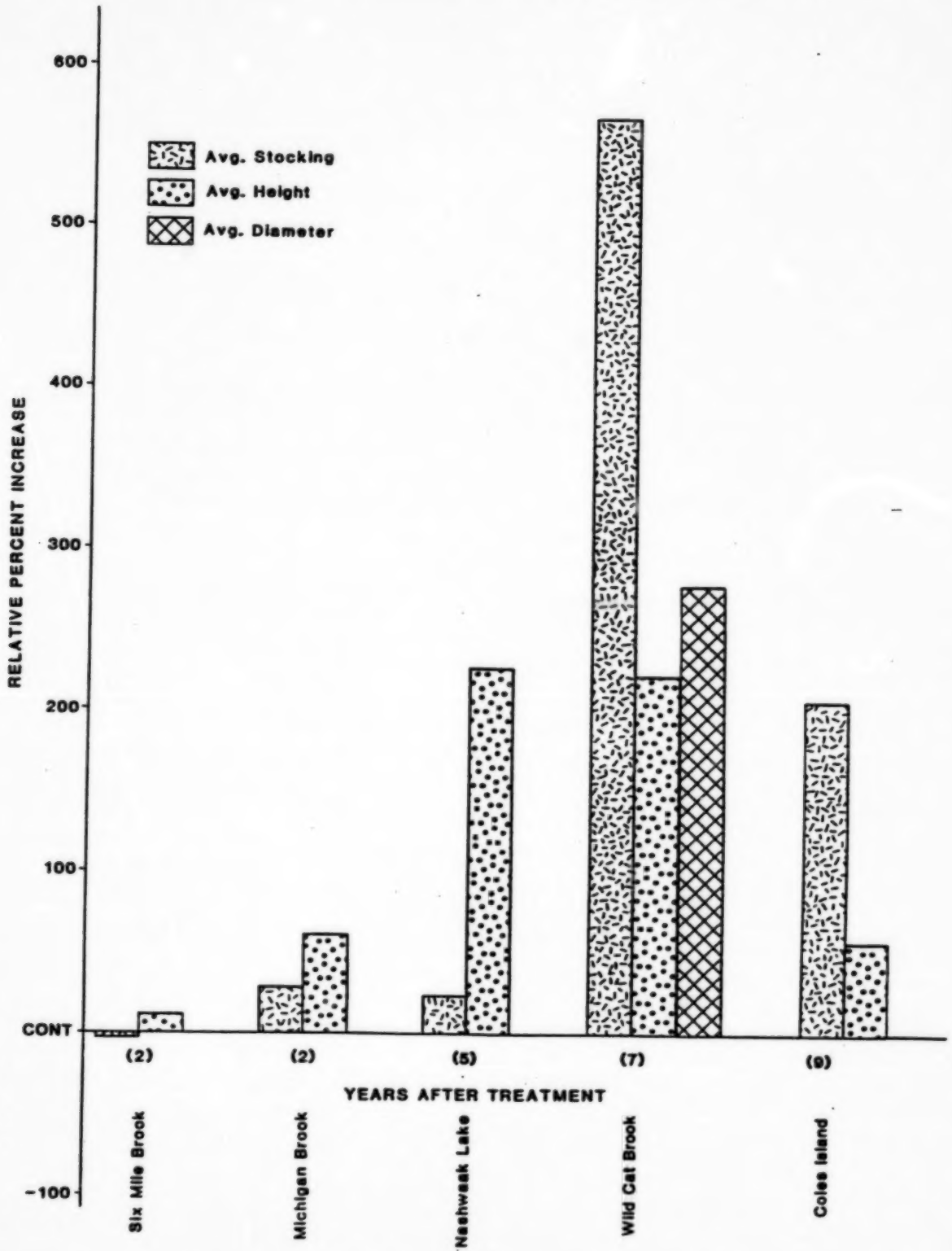
Location	Yr. Planted	Species	Yr. Sprayed	Growth Response Period (Yrs.)	STOCKING NO. TREES/HA		AVERAGE HEIGHT M		AVERAGE DIAMETER CM	
					Control	Treated	Control	Treated	Control	Treated
Six Mile Brook	1984	bs	1985	2	2 200	2 100	0.415	0.465		
Michigan Brook	1984	jp	1985	2	1 450	1 850	0.581	0.912		
Nashwaak Lake	1981	bs	1982	5	2 100	2 600	0.524	1.714		
Wildcat Brook	1976	bs	1980	7	300	2 000	0.762	2.428	1.294 (*0.006	4.875 0.288)
Coles' Island	1976	jp	1978	9	1 050	3 200	3.160	4.934		

* Volume index is expressed in m^3/ha.

$V = D^2H$

where V = volume index
D = diameter 6" above ground
H = total tree height

FIGURE I. Relative growth response to herbicide treatment (CONTROL = 0%)



RESULTS

Without herbicide treatment, stocking is decreased through seedling mortality directly related to the effects of competition. In one instance (Wildcat Brook), the untreated area only had 300 trees per hectare left at age 11 while the treated portion had a very acceptable 2,000. In 4 of the 5 plantations, this trend is evident.

In every plantation, the average heights of the planted softwood stock were greater in the sprayed than the unsprayed areas, ranging anywhere from 12 to 227 percent greater.

At Wildcat Brook, the average relative volume index of the sprayed area was 47 times greater than in the control areas, only 7 years after treatment.